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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,640	03/28/2001	Atsushi Koike	35.C15222	2483

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NEW YORK, NY 10112

EXAMINER

FULLER, ERIC B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

09/818,640

### Applicant(s)

KOIKE ET AL.

### Examiner

Eric B Fuller

### Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,9-13 and 27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,9-13 and 27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-5, 11-13, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100).

Burger teaches a process of supplying a hydrogen gas and a raw material gas for forming a film that comprises at least an Si element (page 5, lines 23-30). High frequency electric power into the discharge electrode may create the plasma (page 3, lines 25-30). The substrate holder, which acts as an auxiliary electrode by producing a substrate bias, is supplied with a frequency that overlaps the applicant's claimed range (page 8, lines 10-15). This auxiliary electrode (figure 1, reference 11) is placed in the vacuum chamber and makes contact with the bottom of the substrate. Since the plasma uniformly coats the substrate by ion bombardment (column 1, lines 60-65), the plasma must inherently contact the area in which the substrate holder holds the substrate. Taking this into consideration, the substrate holder (auxiliary electrode) reads on being "in plasma". Additionally, since Burger differentiates between the substrate holder (11) and the substrate (10), the substrate holder, which acts as the auxiliary electrode, reads on being separate from the substrate. The voltage may be

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pulsed unipolar or bipolar (page 8, lines 25-30). Depending on the polarity of the voltage, which the reference allows for either or both, the ions and/or electrons are excited in order to control the generation of hydrogen radicals and ion bombardment (paragraph bridging pages 10 and 11). The reference fails to teach the frequency of the high frequency electric power supplied to the discharge electrode. However, it is the position of the examiner that since the reference teaches to use a high frequency power source, to use frequencies within the applicant's broad range of 1MHz to 200MHz would have been obvious at the time the invention was made to a person having ordinary skill in the art with the expectation of success, as these values are considered to be high frequencies. Additionally, the reference fails to teach the maximum amplitude of the bias voltage.

However, the reference does teach that there is a cause and effect relationship between the magnitude of the voltage and the hardness of the deposited layer (page 14, lines 4-6). Therefore, it would have been obvious, and within the skill of one practicing in the art, to use voltages that give the desired hardness of the deposited layer. To determine this voltage would have been within the skill of one practicing in the art, through routine experimentation. Additionally, page 10, last paragraph, explicitly reads that the substrate voltage is "independent of the production of plasma" and is "used to control the ion bombardment". This reads on the voltage being lower than the potential of plasma.

As to claim 27, the interpretation of the substrates being analogous to the auxiliary electrodes reads on the limitation of this claim.

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Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100), as applied to claim 1 above, and further in view of Tamura (JP 61-283127).

Burger teaches the limitations of claims 1, but is silent in using multiple electrodes. However, Tamura teaches that by using multiple electrodes that are independently controlled, plasma may be uniformly distributed, which results in better process efficiency (abstract). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use multiple electrodes in the process taught by Burger. By doing so, uniformity of the plasma is increased, resulting in a more efficient process.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100), as applied to claim 1 above, and further in view of Raoux et al. (US 6,162,709).

Burger teaches the limitations of claim 1, as shown above, but fails to explicitly teach the shape of the electrode. However, Raoux teaches a process where a pulsed voltage bias is applied to a substrate by an electrode that is embedded in the substrate holder and comprises a nickel rod that has a small diameter and a small area facing the substrate (column 8, lines 40-50). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the embedded electrode of

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Raoux in the process taught by Burger with the expectation of achieving similar results, as both reference act to supply a pulsed voltage bias to a substrate.

### ***Response to Arguments***

Applicant argues that Burger fails to teach using a voltage that is less than the plasma potential. This argument is not found convincing. The reference explicitly reads that the substrate voltage is "independent of the production of plasma" and is "used to control the ion bombardment". One of ordinary skill would interpret this to read on the voltage being lower than the potential of plasma.

Applicant argues that Burger teaches a substrate holder that acts as an auxiliary electrode and the present invention precludes the substrate being the auxiliary electrode. This argument is not found convincing. The auxiliary electrode in Burger is the substrate holder, which is different from the substrate.

Applicant argues that burger prefers frequencies of 1-100 KHz and that this fails to read on applicant's claimed range. This argument is not found convincing. Burger explicitly teaches frequencies of up to 10MHz, as admitted by the applicant. This reads on the applicant's claimed range.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

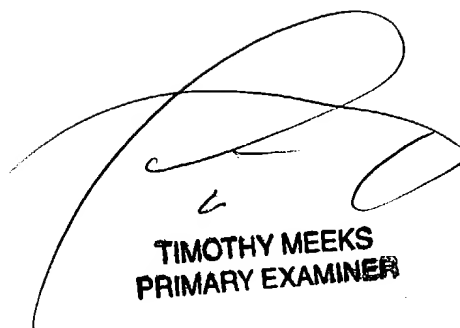
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached at (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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EBF



TIMOTHY MEEKS  
PRIMARY EXAMINER